Center Independent Research & Development: GSFC IRAD

Wideband S-Band Wrap Around Microstrip Antenna

Completed Technology Project (2017 - 2018)

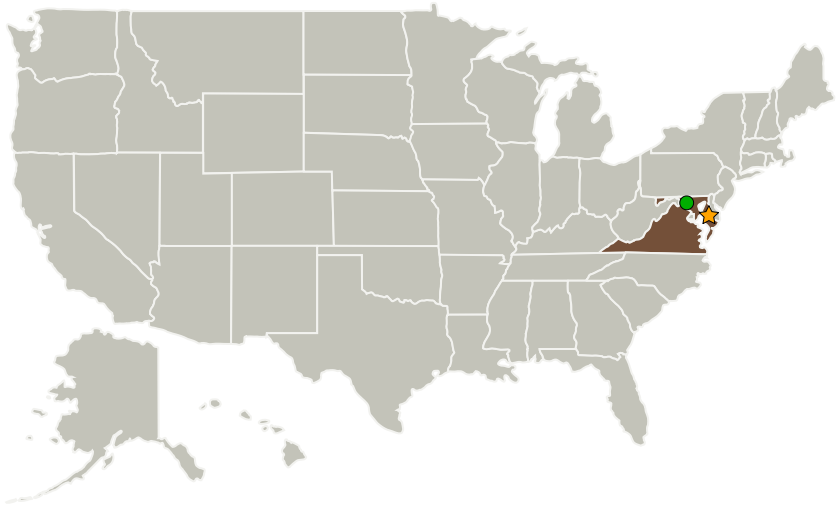
Project Introduction

This project aims to use innovative antenna design techniques to dramatically improve the bandwidth of currently used S-band wrap-around antennas employed by sounding rockets. Present S-Band wrap around antennas have a bandwidth limited to approximately 40 MHz, and there are four separate models at 2215, 2235, 2251, and 2279 MHz needed to cover the band. We will design, fabricate, test, and deliver a prototype S-Band (2200 – 2290 MHz) wrap around antenna with the target bandwidth of 100 MHz, which will cover the whole band with one antenna. A new wideband design, which will consolidate multiple antenna models into one model that can be built in-house, will significantly reduce costs and improve program efficiencies.

Anticipated Benefits

The primary payoff to science is the increase in the downlink data rate for instruments flown on NASA sounding rockets at a reduced cost to the program. With twenty plus missions per year, reducing the number of required antennas from four to one results in a significant reduction in cost to the program. Replacing multiple lower data rate links with a single higher data rate link provides two benefits. First, the science data return is increased by using frequency space previously used for guard bands when multiple downlinks are utilized. Second, the overall telemetry system complexity, cost, and required SWaP is reduced by flying fewer transmitters, encoders, cables, etc.

Primary U.S. Work Locations and Key Partners



Wrap-Around Antenna

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Organizations Performing Work	Role	Type	Location
★Wallops Flight Facility(WFF)	Lead Organization	NASA Facility	Wallops Island, Virginia
●Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Images

Wrap-Around Antenna
Wrap-Around Antenna
(https://techport.nasa.gov/image/28288)

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Wallops Flight Facility (WFF)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:
Peter M Hughes

Project Managers:
Daniel A Mullinix
Michael G Hitch
Wesley A Powell

Principal Investigator:
Marta B Shelton

Co-Investigators:
Steven N Bundick
Daniel A Mullinix

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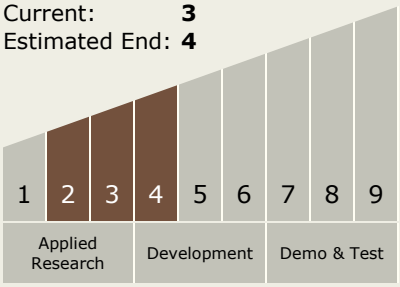
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **4**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.6 Innovative Antennas

Target Destination

Earth

Supported Mission Type

Projected Mission (Pull)